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Report from the Meeting of the GOA Groundfish Plan Teams

September 10-11, 2026

GOA Groundfish Plan Team Members

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Introduction

The Gulf of Alaska (GOA) Groundfish Plan Team (Team) met on September 10–11, 2026, at the Alaska Fisheries Science Center (AFSC) in Seattle, Washington, with some participants attending remotely. The meeting began at 9:00 a.m. PDT on Thursday, September 10. All documents and presentations were posted to the Plan Teams' electronic agenda. Presentation links are provided in the relevant agenda-item headings in this report.

GOA Arrowtooth Flounder Full Assessment & ESP

Kalei Shotwell presented the full operational assessment for the GOA arrowtooth flounder stock, the first full assessment since 2021. A stepwise comparison presented in September 2025 incorporated extensive data improvements and resulted in base Model 25.0, which produced trends similar to those from the model used in 2021. For 2026, the authors evaluated two candidate models with updated data: Model 25.0, with fixed sex-specific natural mortality (*M*), and Model 25.1, with estimated sex-specific *M*.

The models produced qualitatively similar trends in total biomass, spawning stock biomass (SSB), and recruitment, but differed substantially in population scale. The Team noted that estimating *M* in Model 25.1 produced a biologically implausible mortality rate and a nearly threefold increase in mean recruitment to balance the higher natural mortality. The results indicated strong confounding among *M*, selectivity, recruitment, and catchability, suggesting that the data did not independently identify these processes well under the current model structure. The authors proposed Model 25.0 because it produced more stable population trajectories without the extreme shifts in recruitment, selectivity, and population scale associated with estimating *M*.

Arrowtooth flounder catch remains low relative to acceptable biological catch (ABC), averaging 11% annually. Utilization declined from 2024 to 2025 to near the time-series minimum. Biomass is trending upward, and the recommended 2027 ABC of 134,083 t is a 12% increase from 2026. The authors recommended Level 1 scores in all risk-table categories, with no reduction from maximum ABC (maxABC).

Future research priorities include investigating relationships between bottom temperature and catchability, evaluating alternative survey indices from the Alaska Department of Fish and Game (ADF&G) large-mesh survey or the AFSC longline survey, and continuing development of multispecies

models and ecosystem and socioeconomic profile (ESP) models using dynamic structural equation modeling (DSEM).

The Team supported Model 25.0 and agreed with the authors' risk-table scores and recommendations for the overfishing limit (OFL), ABC, and BRDs.

Kalei Shotwell also presented the first full ESP for arrowtooth flounder. The Team first recommended the ESP in 2016; development began in 2024, and a draft was presented in September 2025. Sea surface and bottom temperatures were identified as predictive indicators of recruitment. In the ESP analysis, warmer temperatures contributed directly to reduced spring copepod availability, near-record low larval abundance, and potentially low survival of the 2025 year class at age 0. Future priorities include further integration of DSEM into the Rceattle framework, reorganizing indicators into predictive, contextual, and monitoring categories, and incorporating more socioeconomic information into the DSEM framework.

The Team noted that arrowtooth flounder recruitment has been relatively flat over the time series, except for the 2000 year class, and asked whether DSEM had been used to investigate the relationships underlying that year class. Broader discussion of DSEM informed the recommendation in the General Team Recommendations section. The Team commended the author for advancing the ESP and incorporating DSEM, and encouraged the ESP teams to work together to advance DSEM modeling.

GOA Skates Update Assessment

Lee Cronin-Fine presented an update assessment for GOA Skates. Three groups of skates are included in this assessment: Big skates, Longnose skates, and Other skates. Big skates and Longnose skates are the most common. This tier 5 assessment is done using the Random Effects Model (REMA), and natural mortality is assumed to be equal to 0.1. Separate GOA-wide REMA models were fit to the survey data to determine the OFL and ABC for Big skates and Longnose skate. A second model was fit to area-specific (WGOA, CGOA, and EGOA) survey biomass to estimate the proportion of biomass in each area for BRDs. For Other skates a single GOA-wide REMA model was used. Data updates included catch in 2025 and 2026 as of August 19, 2026 and the 2025 survey biomass estimates from the AFSC GOA Bottom Trawl Survey.

Lee presented the overall and regional trends in biomass and catch for each of the three stocks. He noted that the catch of skates has never exceeded the ABCs or OFLs. Lee also indicated that the Big skate trend appears to be stable, driven by survey biomass estimates from the CGOA and WGOA. On a regional scale, Big skate catch exceeded the CGOA BRD (i.e., subarea apportionment) between 2010 and 2013 and catch was near the CGOA BRD in 2025, where the majority of the survey biomass is found. Survey biomass estimates from the EGOA, which is quite variable, hit a low in 2023 but increased in 2025. In general, the EGOA BRD is typically small. As of Aug 19, catch of Big skates was below 2026 BRDs/ TACs.

The biomass of Longnose skates has increased overall since the 1990s and the population has been stable since 2003. The majority of longnose skate biomass is in the CGOA followed by the EGOA and WGOA. The Team noted that the most recent biomass observation was associated with more uncertainty than in recent years and that this may be due to fewer surveyed stations in 2025. Additionally, biomass in the WGOA has declined since 2021, leading to a smaller BRD. In 2023 the catch of longnose skates was higher than normal in the EGOA and exceeded the TAC for that area. Recent catches have been lower but there is still concern that the 2026 EGOA catch of longnose skates may exceed the BRD.

Survey biomass estimates of Other skates were low prior to 1999, had a small increasing trend between 1999 and 2013, declined between 2013 and 2020 and has stayed at low levels. **The Team noted that the biomass CVs for Other skates seem small and recommended that the author check the design-based standard errors.**

The Team recommended that in the future the author use the additional observation error option in the REMA model to smooth the uncertainty bands for Big skates, Longnose skates, and Other skates.

The Team supported the author's proposed models, OFL, ABC and BRDs and agreed with the risk table scores.

The Team recommended the author review the 2023 SSC and Team comments and the Team continues to agree with the SSC recommendations including reevaluation of M used in the assessment and re-emphasized the need for stock structure information for skates.

Skate BRDs

The Team was asked to discuss the biological impacts of an area catch exceeding the BRD (i.e., if the Council were to reallocate TAC from one area to another so the sum of TACs would not exceed ABC).

Skates are caught incidentally in fixed gear fisheries and inseason managers expect continued effort this fall. As mentioned in the Joint Plan Team report, catch of Longnose skates is likely to hit the 2026 TAC (=BRD) in the EGOA by the end of the year. If TAC is exceeded or likely to be exceeded for a given area, skates would go on PSC status in 2026 which means discarding would be required in the specific management area. The Team discussed this but also commented that placing skates on PSC may not significantly change the behavior of the fishery, since the majority of skate catch is not retained.

The Team was asked to comment on the potential biological impact of using last year's BRDs, and noted several points:

- The survey biomass estimates for longnose skates in the WGOA were the lowest since the 90s. A 50% drop in survey biomass in a single sub-area could be the result of natural survey sampling variability, but if the observed decrease is representative of a biological change in the population, then for a long lived, slow growing species, overharvest in one area could be a biological concern. The Team was concerned that excessive catch in one area could result in localized depletion.
- The Team noted that the WGOA is at the extent of the range of longnose skate, and survey sampling on the edge of the range of a species is often more variable than within the core population. The Team also noted that individuals at the extent of a population's range could be unique in terms of growth, movement behavior, or other life-history characteristics.
- Because the WGOA is at the northern extent of the range for longnose skates, the Team noted that a disproportionate harvest in that area would not be expected to affect the core of the population.
- The Team recognized that its discussion about BRDs would be better informed with more information about stock structure in order to have a more complete understanding of the connectivity, or lack thereof, among the GOA sub-regions.
- The Team noted that the assessment indicates that "since 2005, the stock has been apportioned to address the disproportionate harvest of skates." The Team noted that deviating from the recommended apportionment based upon survey biomass estimates contradicted this point, while at the same time reinforced the need for evaluating stock structure due to more information that may now be available.

The Team emphasized that given the current (simplified) information on stock structure, the assessment represents the best scientific knowledge about how catch advice should be apportioned. In particular, **The Team cautioned against using 2026 BRDs for 2027-2028 due to the low-levels and high uncertainty of survey biomass estimates of longnose skates in the WGOA.**

The Team noted that there is likely a range within which it is biologically reasonable to change the area apportionments and could be based upon the uncertainty in estimates of survey biomass within the GOA sub-regions. The Team discussed quantitative methods that utilize uncertainty in survey estimates of biomass, including providing uncertainty intervals (e.g., 95% confidence intervals) around the sub-region proportions that are subsequently used to define the BRDs based upon uncertainty estimated from REMA. This would provide a scientific framework using information straight from the survey, and would be dependent upon the specific stock and any stock structure information. **The Team supported the idea of using uncertainty in survey estimates to develop a range around the sub-region proportions.**

In terms of process, Council staff clarified that BRDs- the values that come from the recommended apportionment method- would not change; and flexibility to redistribute catch (TAC) in such a way that deviates from the BRDs, would be described in the Plan Team report. The Team discussed the importance of not having the Team choose whether catch gets redistributed but to provide the maximum amount of catch that should be redistributed, from a biological standpoint.

The Team identified two process questions for clarification:

- *Once the Council identifies a stock for Plan Team and SSC advice, should the Team reevaluate that stock's BRDs and associated TAC flexibility every year?*
- *Does any flexibility for an area TAC to deviate from a BRD expire if the Council does not request advice again the following year?*

Harvest Projections

Chris Lunsford presented summary slides for five harvest projection documents (4 stocks): flathead sole, GOA dusky rockfish, GOA deepwater flatfish, and GOA shallow-water flatfish (including northern and southern rock sole). The Team noted that the last operational assessment for the shallow-water flatfish complex was in 2021. **The Team agreed with the authors' recommendation to bring forward an operational assessment for SWF in 2027. The Team supported the authors' recommended OFLs, ABCs, and BRDs for all four stocks .**

Winter Shelikof Acoustic Trawl Survey

Denise McKelvey of the AFSC Midwater Assessment and Conservation Engineering (MACE) Program presented results from the ***winter*** 2026 GOA pollock prespawning acoustic-trawl surveys. The Shumagin, Pavlof, Morzhovoi, and Sanak areas were surveyed in February; biomass trends relative to previous years varied among subareas. Severe weather and vessel icing curtailed the March survey of the Shelikof, Chirikof, and Marmot areas, leaving 11 transects in southern Shelikof Strait unsurveyed. MACE staff used the historical proportion of adult biomass (age 3+) in the northern section during 2018–2025 (88%) to estimate adult biomass in the unsurveyed area. No female pollock longer than 40 cm were found in spawning or spent condition, indicating that survey timing remained appropriate. Winter 2027 surveys are planned aboard the NOAA Ship *Bell M. Shimada* while the NOAA Ship *Oscar Dyson* is in the shipyard.

The Team asked whether earlier spawning during 2015–2018 was related to warmer water. It noted that, although vessel mechanical issues delayed the 2025 survey, the percentage of females in spawning or spent condition remained within the target range of less than 10%. The Team also asked whether spawning timing is accounted for in the assessment. The author confirmed that it is included as a maturity-based catchability covariate. The Team will revisit the missing Shelikof data and methods for estimating biomass in the unsurveyed area in November, when model fits are available.

GOA Pollock Proposed Models

Cole Monnahan presented model updates for the GOA walleye pollock assessment. The 2026 assessment transitions from a bespoke TMB framework to Rceattle, estimates the recruitment variability parameter, and evaluates integration of ecosystem data through DSEM. The authors also investigated the persistent poor fit to the AFSC bottom trawl survey.

The Rceattle bridge of Model 23e matched the bespoke TMB implementation to machine precision. **The Team supported transferring the pollock assessment to Rceattle.**

Cole presented two models for consideration. Model 26a is the Rceattle bridge of Model 23e with the recruitment variability parameter estimated. Model 26b adds a "moderate causal" DSEM module linking the assessment to eight ESP variables. Estimates and diagnostics were generally similar between Models 26a and 26b, although age-1 recruitment in the final model year differed notably. Model 26b did not use DSEM to project recruitment; it retained the status quo use of average recruitment in projections and reference-point calculations.

Discussion focused on whether to use DSEM in an operational assessment and on diagnostics for evaluating its performance, robustness, and influence on assessment results. The DSEM effects shown in the presentation and accompanying document were generally small. Two views emerged: one favored evaluating DSEM as a research model within the ESP framework for several years before operational implementation; the other considered operational implementation that poses low risk to management decisions because DSEM had little effect on the assessment estimates presented.

Cole requested Team and SSC feedback on six questions about implementing DSEM in an operational assessment, including the development and evaluation of directed acyclic graphs (DAGs):

1. How should candidate sets of DAGs be developed, and how many should be considered?
2. How often should the candidate DAGs be revisited and the preferred model changed?
3. How should a causal DAG be selected and validated?
4. How should the risk table be modified when some variables are included in the assessment itself?
5. Should short-term recruitment projections be used in ABC and OFL calculations?
6. Should the harvest control rule (HCR) be modified?

The Team appreciated the authors' input on the first three questions in the September document. It agreed that ESP team expertise should inform DAG development, but noted that some stocks have no plans for ESP development. Whether assessment authors should have latitude to develop DAGs in those cases remained unresolved. The Team suggested the following additional diagnostics to clarify DSEM performance and its influence on assessment results:

- Provide retrospective estimates of DAG parameters to assess the stability of parameter estimates in the DSEM module.
- Conduct sensitivity analyses that remove data streams informing the DAG to assess their relative influence and the consequences of discontinuing those streams.
- Evaluate whether DSEM improves recruitment predictive skill by comparing terminal-year age-1 recruitment estimates informed by DSEM with subsequent estimates for the same year once composition data are available.
- For several projection years, report the proportions of total biomass and SSB attributable to the terminal-year age-1 recruitment estimate in Model 26b, and compare them with results under the status quo mean-recruitment assumption in Model 26a.

The Team recognized the substantial effort devoted to developing and integrating DSEM into the pollock assessment and noted that this work supports national mandates to incorporate ecosystem considerations into stock assessment. **The Team recommended bringing forward both Models 26a and 26b for evaluation in November.**

Cole also presented analyses of the poor fit to the AFSC bottom trawl survey since 2017. They evaluated two hypotheses: movement of eastern Bering Sea (EBS) fish into the WGOA, and changes in vertical availability affecting acoustic or bottom trawl biomass estimates. To examine the first hypothesis, the authors removed the largest tows from the bottom trawl survey time series, because those catches could reflect influxes of EBS fish. The results did not establish that such movement caused the poor fit. The Team supported the authors' plan to work with the Age and Growth Program to investigate stock identification using otolith morphology.

To examine vertical availability, the authors allowed catchability to be freely estimated, which yielded a wide range of catchability estimates. Summer acoustic survey biomass by depth bin also suggested potentially substantial variation in vertical distribution over time, particularly in the biomass above and below 10 m from the bottom. A GOA analysis similar to how the Bering Sea vertical availability analysis was done in 2021 is planned for 2027. The Team expressed increasing concern about the cancellation of the AFSC summer acoustic survey because no other source provides equivalent information on vertical availability to the bottom trawl survey.

GOA Demersal Shelf Rockfish (DSR) Proposed Models

Aaron Lambert presented data updates and proposed model changes for the demersal shelf rockfish (DSR) complex, which comprises seven species in two management areas: Southeast Outside (SEO) and the combined western GOA, central GOA, and West Yakutat area (WG/CG/WY). All species except SEO yelloweye rockfish are assessed under Tier 6. Yelloweye rockfish are assessed under Tier 6 in WG/CG/WY and under Tier 5 in SEO. The SEO assessment uses biomass indices from the International Pacific Halibut Commission (IPHC) survey and the ADF&G remotely operated vehicle (ROV) survey. REMA produces smoothed biomass estimates for each of four SEO management subareas.

Data changes included removing 13 IPHC survey stations in inside waters, updating SEO fishery weights, expressing IPHC catch per unit effort (CPUE) as weight per hook rather than number per hook, and incorporating an IPHC hook-adjustment factor to account for hook competition. Mechanical issues prevented a new ADF&G ROV survey since the last full assessment.

The proposed methodology implements the SSC's recommendation to standardize IPHC CPUE using a zero-inflated spatiotemporal model in sdmTMB, replacing the generalized additive model (GAM) used previously.

Aaron evaluated the sdmTMB models using cross-validation, Akaike information criterion (AIC), mean absolute error, and root mean squared error, and recommended a first-order autoregressive spatiotemporal structure. The resulting index was highly correlated with the GAM index but showed less interannual variation associated with small sample sizes in some areas and years. By linking estimates across years, the spatiotemporal structure produced a smoother time series and addressed sparse survey samples. A bridging analysis showed the effects of each data and model change relative to the 2024 assessment.

The recommended sdmTMB model produced higher recent biomass estimates and lower CVs than the GAM approach. The largest changes resulted from the hook adjustment and conversion of CPUE to weight per hook. Concerned that the CVs might underestimate uncertainty, the author proposed a bootstrap procedure that would resample IPHC survey sampling unit, refit the sdmTMB model, and use the resulting distribution of estimates to calculate CVs for REMA.

The Team and authors expressed concern about reduced survey effort for SEO yelloweye rockfish. The ADF&G ROV survey was last conducted in 2023, and the timing of the next survey is uncertain; it may not occur until after 2028. IPHC survey effort has declined in most SEO management subareas since 2024, leaving some area-year combinations with no samples or fewer than five samples.

Given these concerns, the Team discussed whether reliable biomass estimates would remain available to support Tier 5 assessment, and the author presented exploratory Tier 6 calculations. Tier 6 is intended to reflect catches during a period of incidental fishing, but the history of directed yelloweye rockfish fishing leaves no available catch-data period representing incidental fishing alone. One possibility discussed was basing Tier 6 ABCs on average ABC over a defined period rather than on average catch, noting that the fishery has historically been managed to a catch limit below ABC.

The Team commended the assessment team for their work updating the data and analyses. **The Team recommended presenting the following in November: (1) the previously accepted model for continuity in bridging; (2) the author-recommended sdmTMB model; (3) a model using bootstrapped IPHC CVs as inputs to REMA; and (4) additional Tier 6 calculations evaluating appropriate periods for averaging catch or ABC.**

GOA Rex Sole Full Assessment

Carey McGilliard presented the 2026 rex sole full assessment. Alternatives included the previously accepted 2021 model, Model 25.0, and Model 25.1. Model 25.0 was presented to the Center for Independent Experts (CIE) and the Team in 2025 and was updated with the most recent data. The author-recommended Model 25.1 builds on Model 25.0 by adding an ageing-error matrix.

Carey and the Team discussed poor fits to CGOA/WGOA survey biomass in 2023 and 2025 and conflicting patterns in fits to the 2025 survey age and length data. EGOA survey biomass increased substantially in 2025. The Team discussed the 2025 survey redesign, which was considered unlikely to have materially affected rex sole biomass estimates. Survey staff suggested investigating whether an unusually large haul influenced the EGOA estimate, as had been considered for GOA pollock. Fits to 2025 fishery lengths and 2023–2024 fishery ages showed residual patterns; 2025 fishery ages were not yet available.

Carey's proposed model did not fully explain recent population dynamics but captured historical dynamics reasonably well. Unexplained movement or growth could be affecting availability between the two areas in ways not represented by the model. Proposed research includes updating maturity, exploring spatial variability, and testing time-varying dynamics. **The Team supported the research plan and recommended Model 25.1 and its corresponding OFL, ABC, and BRDs.**

A bridge to the SPoRC framework was presented in Appendix B of the assessment, together with the author's recommendation to transition from SS3 to SPoRC in future assessments. Results for Models 25.0 and 25.1 were included so that bridging could be completed during the current assessment cycle. The Team noted the anticipated end of SS3 support and the need to retain the current SS3.exe files for future bridging. Given the close agreement between SS3 and SPoRC, the Team concluded that there was no reason to wait four years to complete the bridge. SPoRC reproduced the SS3 output well and can address spatial components of the assessment. **The Team recommended using SPoRC for the next operational assessment.**

GOA Thornyhead Rockfish Proposed Models

Kevin Siwike presented proposed models for the GOA thornyhead rockfish complex. An operational update assessment was scheduled for 2026, but changes to the 2025 bottom trawl survey stratification

required alternative model configurations. The authors presented options for reconciling the restratified survey with the historical time series.

The previous assessment used three depth strata—0–500 m, 501–700 m, and 701–1,000 m—corresponding to survey depth boundaries through 2023. The restratified survey has no boundary at 500 m, and the 500–700 m stratum was not sampled during 1990–2001. The authors combined strata into 0–700 m and 701–1,000 m and evaluated three approaches to the historical missing data: (1) make no adjustment in years with missing strata (Model 24.2d); (2) impute missing 500–700 m biomass using the time-series mean (Model 24.2e); or (3) remove years with missing 500–700 m data (Model 24.2f). The authors proposed Model 24.2f for ABC/OFL.

Team discussion favored removing those years rather than imputing data because the omitted years are at the beginning of the time series and have little influence on recent biomass estimates; they produced exceptionally low biomass estimates that were difficult to explain; and future trawl surveys are unlikely to sample depths greater than 700 m. The Team also noted that the 2025 CGOA survey biomass estimate was the lowest in the time series regardless of the model selected.

The Team recommended bringing Model 24.2f forward in November. The base model cannot be updated for 2026 because of the change in survey stratification. **The Team therefore also recommended bringing Models 23 A–F forward as continuity models.**

For the next full assessment, the author hopes to evaluate a model-based index with depth as a covariate. The Team supported that investigation but raised concern about using modeled data as inputs to another model when passing a model-based index to REMA.

Team Recommendations in General

The Team reviewed ESP and DSEM results for two stocks and received an ESP update during the Joint Plan Team session. They encouraged the ESP teams and assessment authors to continue this work.

The presentations highlighted the importance of formulating the DAG and the possibility that multiple models could receive substantial statistical support. **The Team recommended that DSEM developers consider methods for accommodating multiple models and hypotheses, particularly when alternative models have different ecological interpretations.**

BRD discussions addressed issues relevant to many GOA stocks. **The Team recommended that assessment authors and the AFSC work closely with Council staff to ensure that BRDs are used correctly in place of historical subarea ABCs in the apportionment and executive summary sections of SAFE documents.**

November BRD Review

Sara Cleaver indicated that the Team will provide BRD advice in November in response to the Council's motion for GOA shortraker rockfish, rougheye and blackspotted rockfish, and thornyhead rockfish. Council staff will work with assessment authors to make relevant materials available for review. As with GOA skates, the November BRD reviews are expected to be streamlined to accommodate the large number of assessments scheduled for consideration.

Halibut Discard Mortality Rates

The Team reviewed halibut discard mortality rates (DMRs) during Mike Fey's presentation on behalf of the Halibut DMR Working Group at the Joint Meeting of the Groundfish Plan Teams. **The Team agreed with the Working Group's recommendations.**

Proposed Specifications

Abby Jahn reviewed the proposed 2027–2028 GOA groundfish specifications, which roll over the final harvest specifications published in March 2026. The proposed OFL, ABC, and BRD recommendations are provided in Table 1 of the linked proposed harvest specifications for 2027 and 2028.

Recommendations on Final Assessments

The Team reviewed its final OFL, ABC, and BRD recommendations for stocks assessed in September 2026. These recommendations are provided in Table 1 of the linked final harvest specifications for 2027 and 2028.